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Relevance scale

1 Interposed request routing for scalable network storage
February 2002 **ACM Transactions on Computer Systems (TOCS)**, Volume 20 Issue 1

Full text available: pdf(363.12 KB) Additional Information: full citation, abstract, references, index terms, review

This paper explores interposed request routing in Slice, a new storage system architecture for high-speed networks incorporating network-attached block storage. Slice interposes a request switching filter---called a *μproxy*---along each client's network path to the storage service (e.g., in a network adapter or switch). The μproxy intercepts request traffic and distributes it across a server ensemble. We propose request routing schemes for I/O and file service traffic, and explore th ...

Keywords: Content switch, file server, network file system, network storage, request redirection, service virtualization

2 The state of the art in locally distributed Web-server systems
Valeria Cardellini, Emiliano Casalicchio, Michele Colajanni, Philip S. Yu
June 2002 **ACM Computing Surveys (CSUR)**, Volume 34 Issue 2

Full text available: pdf(1.41 MB) Additional Information: full citation, abstract, references, citings, index terms

The overall increase in traffic on the World Wide Web is augmenting user-perceived response times from popular Web sites, especially in conjunction with special events. System platforms that do not replicate information content cannot provide the needed scalability to handle large traffic volumes and to match rapid and dramatic changes in the number of clients. The need to improve the performance of Web-based services has produced a variety of novel content delivery architectures. This article w ...

Keywords: Client/server, World Wide Web, cluster-based architectures, dispatching algorithms, distributed systems, load balancing, routing mechanisms

3 Fast detection of communication patterns in distributed executions
Thomas Kunz, Michiel F. H. Seuren
November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**

Full text available: pdf(4.21 MB) Additional Information: full citation, abstract, references, index terms

Understanding distributed applications is a tedious and difficult task. Visualizations based on process-time diagrams are often used to obtain a better understanding of the execution of the application. The visualization tool we use is Poet, an event tracer developed at the University of Waterloo. However, these diagrams are often very complex and do not provide the user with the desired overview of the application. In our experience, such tools display repeated occurrences of non-trivial commun ...

4 Session summaries from the 17th symposium on operating systems principle (SOSP'99)

Jay Lepreau, Eric Eide

April 2000 **ACM SIGOPS Operating Systems Review**, Volume 34 Issue 2

Full text available: pdf(3.15 MB) Additional Information: full citation, index terms

5 System support for pervasive applications

Robert Grimm, Janet Davis, Eric Lemar, Adam Macbeth, Steven Swanson, Thomas Anderson, Brian Bershad, Gaetano Borriello, Steven Gribble, David Wetherall

November 2004 **ACM Transactions on Computer Systems (TOCS)**, Volume 22 Issue 4

Full text available: pdf(1.82 MB) Additional Information: full citation, abstract, references, index terms

Pervasive computing provides an attractive vision for the future of computing. Computational power will be available everywhere. Mobile and stationary devices will dynamically connect and coordinate to seamlessly help people in accomplishing their tasks. For this vision to become a reality, developers must build applications that constantly adapt to a highly dynamic computing environment. To make the developers' task feasible, we present a system architecture for pervasive computing, called & ...

Keywords: Asynchronous events, checkpointing, discovery, logic/operation pattern, migration, one.world, pervasive computing, structured I/O, tuples, ubiquitous computing

6 Manageability, availability, and performance in porcupine: a highly scalable, cluster-based mail service

Yasushi Saito, Brian N. Bershad, Henry M. Levy

August 2000 **ACM Transactions on Computer Systems (TOCS)**, Volume 18 Issue 3

Full text available: pdf(2.52 MB) Additional Information: full citation, abstract, references, index terms

This paper describes the motivation, design and performance of Porcupine, a scalable mail server. The goal of Porcupine is to provide a highly available and scalable electronic mail service using a large cluster of commodity PCs. We designed Porcupine to be easy to manage by emphasizing dynamic load balancing, automatic configuration, and graceful degradation in the presence of failures. Key to the system's manageability, availability, and performance is that sessions, data, and underlying ...

Keywords: cluster, distributed systems, email, group membership protocol, load balancing, replication

7 The session token protocol for forensics and traceback

Brian Carrier, Clay Shields

August 2004 **ACM Transactions on Information and System Security (TISSEC)**, Volume 7 Issue 3

Full text available: pdf(331.18 KB) Additional Information: full citation, abstract, references, index terms

In this paper we present the Session Token Protocol (STOP), a new protocol that can assist in the forensic analysis of a computer involved in malicious network activity. It has been designed to help automate the process of tracing attackers who log on to a series of hosts to hide their identity. STOP utilizes the Identification Protocol infrastructure, improving both its capabilities and user privacy. On request, the STOP protocol saves user-level and application-level data associated with a par ...

Keywords: Digital forensics, TCP traceback, auditing and intrusion detection, digital investigations, privacy

8 Using proxy cache relocation to accelerate Web browsing in wireless/mobile communications

Stathes Hadjiefthymiades, Lazaros Merakos

April 2001 **Proceedings of the tenth international conference on World Wide Web**

Full text available: pdf(321.90 KB) Additional Information: full citation, references, index terms

Keywords: W4, cache relocation, learning automaton, mobile computing, path prediction, proxy cache

9 File and storage systems: Preserving peer replicas by rate-limited sampled voting

Petros Maniatis, David S. H. Rosenthal, Mema Roussopoulos, Mary Baker, TJ Giuli, Yanto Muliadi

October 2003 **Proceedings of the nineteenth ACM symposium on Operating systems principles**

Full text available: pdf(336.27 KB) Additional Information: full citation, abstract, references, citings, index terms

The LOCKSS project has developed and deployed in a world-wide test a peer-to-peer system for preserving access to journals and other archival information published on the Web. It consists of a large number of independent, low-cost, persistent web caches that cooperate to detect and repair damage to their content by voting in "opinion polls." Based on this experience, we present a design for and simulations of a novel protocol for voting in systems of this kind. It incorporates rate limitation an ...

Keywords: digital preservation, rate limiting, replicated storage

10 Manageability, availability and performance in Porcupine: a highly scalable, cluster-based mail service

Yasushi Saito, Brian N. Bershad, Henry M. Levy

December 1999 **ACM SIGOPS Operating Systems Review , Proceedings of the seventeenth ACM symposium on Operating systems principles**, Volume 33 Issue 5

Full text available: pdf(1.62 MB) Additional Information: full citation, abstract, references, citings, index terms

This paper describes the motivation, design, and performance of Porcupine, a scalable mail server. The goal of Porcupine is to provide a highly available and scalable electronic mail service using a large cluster of commodity PCs. We designed Porcupine to be easy to manage by emphasizing dynamic load balancing, automatic configuration, and graceful degradation in the presence of failures. Key to the system's manageability, availability, and performance is that sessions, data, and underlying serv ...

11 Proxies + path prediction: improving Web service provision in wireless-mobile communications



Stathes Hadjiefthymiades, Lazaros Merakos
August 2003 **Mobile Networks and Applications**, Volume 8 Issue 4

Full text available: pdf(255.84 KB) Additional Information: full citation, abstract, references, index terms

Mobile computing is considered of major importance to the computing industry for the forthcoming years due to the progress in the wireless communications area. A proxy-based architecture for accelerating Web browsing in wireless customer premises networks is presented. Proxy caches, maintained in base stations, are constantly relocated to follow the roaming user. A cache management scheme is proposed, which involves the relocation of full caches to the most probable cells but also percentages of ...

Keywords: cache relocation, caching proxy, mobile computing, path prediction algorithm

12 Packet classification using tuple space search



V. Srinivasan, S. Suri, G. Varghese
August 1999 **ACM SIGCOMM Computer Communication Review , Proceedings of the conference on Applications, technologies, architectures, and protocols for computer communication**, Volume 29 Issue 4

Full text available: pdf(1.46 MB) Additional Information: full citation, abstract, references, citings, index terms

Routers must perform packet classification at high speeds to efficiently implement functions such as firewalls and QoS routing. Packet classification requires matching each packet against a database of filters (or rules), and forwarding the packet according to the highest priority filter. Existing filter schemes with fast lookup time do not scale to large filter databases. Other more scalable schemes work for 2-dimensional filters, but their lookup times degrade quickly with each additional dime ...

13 Rethinking the design of the Internet: the end-to-end arguments vs. the brave new world



Marjory S. Blumenthal, David D. Clark
August 2001 **ACM Transactions on Internet Technology (TOIT)**, Volume 1 Issue 1

Full text available: pdf(176.33 KB) Additional Information: full citation, abstract, references, citings, index terms

This article looks at the Internet and the changing set of requirements for the Internet as it becomes more commercial, more oriented toward the consumer, and used for a wider set of purposes. We discuss a set of principles that have guided the design of the Internet, called the end-to-end arguments, and we conclude that there is a risk that the range of new requirements now emerging could have the consequence of compromising the Internet's original design principles. Were ...

Keywords: ISP, Internet, end-to-end argument

14 LegionFS: a secure and scalable file system supporting cross-domain high-performance applications



Brian S. White, Michael Walker, Marty Humphrey, Andrew S. Grimshaw
November 2001 **Proceedings of the 2001 ACM/IEEE conference on Supercomputing (CDROM)**

Full text available: pdf(499.88 KB) Additional Information: full citation, abstract, references, citings, index terms

Realizing that current file systems can not cope with the diverse requirements of wide-area

collaborations, researchers have developed data access facilities to meet their needs. Recent work has focused on comprehensive data access architectures. In order to fulfill the evolving requirements in this environment, we suggest a more fully-integrated architecture built upon the fundamental tenets of naming, security, scalability, extensibility, and adaptability. These form the underpinning of the Le ...

15 IO-Lite: a unified I/O buffering and caching system

Vivek S. Pai, Peter Druschel, Willy Zwaenepoel

February 2000 **ACM Transactions on Computer Systems (TOCS)**, Volume 18 Issue 1

Full text available: pdf(196.15 KB) Additional Information: full citation, abstract, references, citings, index terms

This article presents the design, implementation, and evaluation of IO -Lite, a unified I/O buffering and caching system for general-purpose operating systems. IO-Lite unifies all buffering and caching in the system, to the extent permitted by the hardware. In particular, it allows applications, the interprocess communication system, the file system, the file cache, and the network subsystem to safely and concurrently share a single physical copy of the data. Protection and ...

Keywords: I/O buffering, caching, networking, zero-copy

16 Papers: ESW4: enhanced scheme for WWW computing in wireless communication environments

Stathes Hadjiefthymiades, Lazaros Merakos

October 1999 **ACM SIGCOMM Computer Communication Review**, Volume 29 Issue 5

Full text available: pdf(1.18 MB) Additional Information: full citation, abstract, references, citings

Mobile computing is considered of major importance to the computing industry for the forthcoming years due to the progress in the wireless communications domain. In this paper, we present a proxy-based architecture, called ESW4, which manages to accelerate Web browsing in wireless CPNs. Proxy caches, maintained in base stations, are constantly relocated to accompany the roaming user. We discuss a cache management scheme involving the relocation of full caches to the most candidate cells but also ...

17 Stateful distributed interposition

John Reumann, Kang G. Shin

February 2004 **ACM Transactions on Computer Systems (TOCS)**, Volume 22 Issue 1

Full text available: pdf(833.84 KB) Additional Information: full citation, abstract, references, index terms

Interposition-based system enhancements for multitiered servers are difficult to build because important system context is typically lost at application and machine boundaries. For example, resource quotas and user identities do not propagate easily between cooperating services that execute on different hosts or that communicate with each other via intermediary services. Application-transparent system enhancement is difficult to achieve when such context information is obscured by complex servic ...

Keywords: Distributed computing, component services, distributed context, multitiered services, operating systems, server consolidation

18 Nark: receiver-based multicast non-repudiation and key management

Bob Briscoe, Ian Fairman

November 1999 **Proceedings of the 1st ACM conference on Electronic commerce**

Full text available: pdf(168.86 KB) Additional Information: full citation, references, citings, index terms

Keywords: Internet, audit trail, key management, multicast, non-repudiation, smartcard, watermark

19 Building efficient wireless sensor networks with low-level naming

John Heidemann, Fabio Silva, Chalermek Intanagonwiwat, Ramesh Govindan, Deborah Estrin, Deepak Ganesan

October 2001 **ACM SIGOPS Operating Systems Review , Proceedings of the eighteenth ACM symposium on Operating systems principles**, Volume 35 Issue 5

Full text available: pdf(1.54 MB) Additional Information: full citation, abstract, references, citings, index terms

In most distributed systems, naming of nodes for low-level communication leverages topological location (such as node addresses) and is independent of any application. In this paper, we investigate an emerging class of distributed systems where low-level communication does not rely on network topological location. Rather, low-level communication is based on attributes that are *external* to the network topology and *relevant* to the application. When combined with dense deployment of n ...

20 Next century challenges: data-centric networking for invisible computing: the Portolano project at the University of Washington

Mike Esler, Jeffrey Hightower, Tom Anderson, Gaetano Borriello

August 1999 **Proceedings of the 5th annual ACM/IEEE international conference on Mobile computing and networking**

Full text available: pdf(1.03 MB) Additional Information: full citation, references, citings, index terms

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Relevance scale

21 Internet indirection infrastructure

Ion Stoica, Daniel Adkins, Shelley Zhuang, Scott Shenker, Sonesh Surana

August 2002 **ACM SIGCOMM Computer Communication Review , Proceedings of the 2002 conference on Applications, technologies, architectures, and protocols for computer communications**, Volume 32 Issue 4

Full text available: pdf(303.69 KB) Additional Information: full citation, abstract, references, citings, index terms

Attempts to generalize the Internet's point-to-point communication abstraction to provide services like multicast, anycast, and mobility have faced challenging technical problems and deployment barriers. To ease the deployment of such services, this paper proposes an overlay-based Internet Indirection Infrastructure (I3) that offers a rendezvous-based communication abstraction. Instead of explicitly sending a packet to a destination, each packet is associated with an identifier; this identifier ...

Keywords: abstraction, architecture, indirection, internet, scalable

22 Measuring and characterizing end-to-end Internet service performance

Ludmila Cherkasova, Yun Fu, Wenting Tang, Amin Vahdat

November 2003 **ACM Transactions on Internet Technology (TOIT)**, Volume 3 Issue 4

Full text available: pdf(1.46 MB) Additional Information: full citation, abstract, references, index terms

Fundamental to the design of reliable, high-performance network services is an understanding of the performance characteristics of the service as perceived by the client population as a whole. Understanding and measuring such end-to-end service performance is a challenging task. Current techniques include periodic sampling of service characteristics from strategic locations in the network and instrumenting Web pages with code that reports client-perceived latency back to a performance server. Li ...

Keywords: End-to-end service performance, QoS, network packet traces, passive monitoring, reconstruction of web page composition, web site performance

23 Internet indirection infrastructure

Ion Stoica, Daniel Adkins, Shelley Zhuang, Scott Shenker, Sonesh Surana

April 2004 **IEEE/ACM Transactions on Networking (TON)**, Volume 12 Issue 2

Full text available: pdf(583.64 KB) Additional Information: full citation, abstract, references, index terms

Attempts to generalize the Internet's point-to-point communication abstraction to provide services like multicast, anycast, and mobility have faced challenging technical problems and deployment barriers. To ease the deployment of such services, this paper proposes a general, overlay-based Internet Indirection Infrastructure (*i*3) that offers a rendezvous-based communication abstraction. Instead of explicitly sending a packet to a destination, each packet is associated with an identifier; t ...

Keywords: anycast, indirection, mobility, multicast, network infrastructure, service composition

24 A layered naming architecture for the internet

Hari Balakrishnan, Karthik Lakshminarayanan, Sylvia Ratnasamy, Scott Shenker, Ion Stoica, Michael Walfish

August 2004 **ACM SIGCOMM Computer Communication Review , Proceedings of the 2004 conference on Applications, technologies, architectures, and protocols for computer communications**, Volume 34 Issue 4

Full text available: pdf(110.95 KB) Additional Information: full citation, abstract, references, citings, index terms

Currently the Internet has only one level of name resolution, DNS, which converts user-level domain names into IP addresses. In this paper we borrow liberally from the literature to argue that there should be three levels of name resolution: from user-level descriptors to service identifiers; from service identifiers to endpoint identifiers; and from endpoint identifiers to IP addresses. These additional levels of naming and resolution (1) allow services and data to be first class Internet objec ...

Keywords: distributed hash tables, global identifiers, internet architecture, middleboxes, name resolution, naming

25 Network support for mobile multimedia using a self-adaptive distributed proxy

Zhuoqing Morley Mao, Hoi-sheung Wilson So, Byunghoon Kang

January 2001 **Proceedings of the 11th international workshop on Network and operating systems support for digital audio and video**

Full text available: pdf(212.65 KB) Additional Information: full citation, abstract, references, index terms

Recent advancements in video and audio codec technologies~(e.g., RealV ideo [18] make multimedia streaming possible across a wide range of network conditions. With an increasing trend of ubiquitous connectivity, more and more areas have overlapping coverage of multiple wired and wireless networks. Because the best network service changes as the user moves, to provide good multimedia application performance, the service needs to adapt to user movement as well as network and computational res ...

26 Experiences with network-based user agents for mobile applications

Thomas F. La Porta, Thomas Woo, Krishan K. Sabnani, Ramachandran Ramjee

August 1998 **Mobile Networks and Applications**, Volume 3 Issue 2

Full text available: pdf(631.57 KB) Additional Information: full citation, abstract, references, citings, index terms

Wireless networks are characterized by simple end devices and limited bandwidth. One solution to address these and other limitations of the wireless mobile environment that has been widely pursued is the placement of proxies, or agents, inside the network to assist with application processing that would normally take place on end devices. These agents can additionally manipulate data to reduce bandwidth requirements and assist in providing services. The design and implementation of a user a ...

27 High-speed policy-based packet forwarding using efficient multi-dimensional range matching

T. V. Lakshman, D. Stiliadis

October 1998 **ACM SIGCOMM Computer Communication Review , Proceedings of the ACM SIGCOMM '98 conference on Applications, technologies, architectures, and protocols for computer communication**, Volume 28 Issue 4

Full text available: pdf(1.82 MB) Additional Information: full citation, abstract, references, citings, index terms

The ability to provide differentiated services to users with widely varying requirements is becoming increasingly important, and Internet Service Providers would like to provide these differentiated services using the same shared network infrastructure. The key mechanism, that enables differentiation in a connectionless network, is the packet classification function that parses the headers of the packets, and after determining their context, classifies them based on administrative policies or re ...

28 Session 2: secure Web services: Designing a distributed access control processor for network services on the Web

Reiner Kraft

November 2002 **Proceedings of the 2002 ACM workshop on XML security**

Full text available: pdf(301.14 KB) Additional Information: full citation, abstract, references, index terms

The service oriented architecture (SOA) is gaining more momentum with the advent of network services on the Web. A programmable and machine accessible Web is the vision of many,and might represent a step towards the semantic Web. However, security is a crucial requirement for the serious usage and adoption of the Web services technology. This paper enumerates design goals for an access control model for Web services. It then introduces an abstract general model for Web services components, along ...

Keywords: Web services, XML, access control, security

29 Summary-based routing for content-based event distribution networks

Yi-Min Wang, Lili Qiu, Chad Verbowski, Dimitris Achlioptas, Gautam Das, Paul Larson

October 2004 **ACM SIGCOMM Computer Communication Review**, Volume 34 Issue 5

Full text available: pdf(2.82 MB) Additional Information: full citation, abstract, references

Providing scalable distributed Web-based eventing services has been an important research topic. It is desirable to have an effective mechanism for the servers to summarize their filters for in-network preprocessing in order to optimize system performance. In this paper, we propose a summary-based routing mechanism and introduce the notion of imprecise summaries to provide a trade-off between routing overhead and event traffic. Our system uses similarity-based filter clustering to reduce overall ...

30 Routing and handoff in the edge mobility architecture

Alan O'Neill, M. Scott Corson, George Tsirtsis

October 2000 **ACM SIGMOBILE Mobile Computing and Communications Review**, Volume 4 Issue 4

Full text available: pdf(1.75 MB) Additional Information: full citation, abstract, index terms

We consider a future IP network architecture in which the core topology is fixed but where the hosts at the edge of the network may be mobile, as is the case in cellular networks. Within this architecture, Mobile-Enhanced Routing (MER) protocols are used to support the prefix-routed requirements of the fixed Internet, along with the movement of IP addresses allocated to mobile nodes. We outline a specific components for the support of such edge mobility (EMA:MER) that offers fixed/mobile IP netw ...

31 The PIM architecture for wide-area multicast routing



Stephen Deering, Deborah L. Estrin, Dino Farinacci, Van Jacobson, Ching-Gung Liu, Liming Wei
April 1996 **IEEE/ACM Transactions on Networking (TON)**, Volume 4 Issue 2

Full text available: pdf(1.09 MB) Additional Information: full citation, references, citings, index terms, review

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